

1. TRANSMITTED DATA

1-1 CHANNEL MESSAGES [H]:Hex, [D]:Decimal

Status [Hex]	Second [H] [D]	Third [H] [D]	Description	(Transmitted by)	ENA
8n	kk (kk)	40 (64)	Note Off		*1 A
9n	kk (kk)	vv (vv)	Note On vv=1~127		*1 A
Bn	01 (01)	vv (vv)	Modulation1	(Mod Wheel)	C
Bn	02 (02)	vv (vv)	Modulation2	(A.P=BreathC)	C
Bn	04 (04)	vv (vv)	Foot Control	(A.P=FootPdl)	C
Bn	06 (06)	vv (vv)	Data Entry (MSB)	(Panel Control)	*2 C
Bn	07 (07)	vv (vv)	Volume	(A.P=Volume)	C
Bn	0A (10)	vv (vv)	Panpot	(A.P=Panpot)	C
Bn	0B (11)	vv (vv)	Expression	(A.P=Exp Pdl)	C
Bn	40 (64)	00/7F (0/127)	Sustain Off/On	(A.S=Damper)	C
Bn	41 (65)	00/7F (0/127)	Portamento Off/On	(A.S=Portmnt)	C
Bn	62 (98)	vv (vv)	NRPN (LSB)	(P.C)	*2 C
Bn	63 (99)	vv (vv)	NRPN (MSB)	(P.C)	*2 C
Bn	cc (cc)	vv (vv)	Control Change cc=00~95	(P.C, S.C)	*3 C
Cn	pp (pp)	-- --	Program Change	(Prog Change)	P
Dn	vv (vv)	-- --	Channel Pressure	(A.P=A.Touch)	C
En	bb (bb)	bb (bb)	Pitch Bender Change	(Bend Wheel)	B

n : MIDI Channel = 0 ~ F

vv : Value

A.P: Assignable Pedal

A.S: Assignable Switch

P.C: Panel Control

S.C: Sync Control

ENA = A : Always Enable

C : Enabled when Global CtrlChg is enabled.

P : Enabled when Global ProgChg is enabled.

B : Enabled when Global P.Bend is enabled.

*1 : kk = 5 ~ 120 : MS2000 (44Keys + OCT + Transpose)
= 21 ~ 108 : MS2000R (16Keys + OCT + Transpose)

*2 : Non Registered Parameter Number (NRPN)

MSB [H]	LSB [H]	Parameter	Data Entry(MSB) Value
00	02	Arpeggio On/Off	00~3F/40~7F:OFF/ON
00	03	Arpeggio Octaves	00~03 :1~4 Oct.
00	04	Arpeggio Latch On/Off	00~3F/40~7F:OFF/ON
00	07	Arpeggio Type	*2-1
00	0A	Arpeggio Gate	*2-2
04	00	Patch1 Source/Fc Mod Source	*2-3 / *2-3
04	01	Patch2 Source	*2-3
04	02	Patch3 Source	*2-3
04	03	Patch4 Source	*2-3
04	08	Patch1 Destination	*2-4
04	09	Patch2 Destination	*2-4
04	0A	Patch3 Destination	*2-4
04	0B	Patch4 Destination	*2-4
04	10	SEQ1 Step[01]/CH[01] LEVEL	*2-5 / 00~7F:0~127
04	11	SEQ1 Step[02]/CH[02] LEVEL	*2-5 / 00~7F:0~127
04	12	SEQ1 Step[03]/CH[03] LEVEL	*2-5 / 00~7F:0~127
04	13	SEQ1 Step[04]/CH[04] LEVEL	*2-5 / 00~7F:0~127
04	14	SEQ1 Step[05]/CH[05] LEVEL	*2-5 / 00~7F:0~127
04	15	SEQ1 Step[06]/CH[06] LEVEL	*2-5 / 00~7F:0~127
04	16	SEQ1 Step[07]/CH[07] LEVEL	*2-5 / 00~7F:0~127
04	17	SEQ1 Step[08]/CH[08] LEVEL	*2-5 / 00~7F:0~127
04	18	SEQ1 Step[09]/CH[09] LEVEL	*2-5 / 00~7F:0~127
04	19	SEQ1 Step[10]/CH[10] LEVEL	*2-5 / 00~7F:0~127
04	1A	SEQ1 Step[11]/CH[11] LEVEL	*2-5 / 00~7F:0~127
04	1B	SEQ1 Step[12]/CH[12] LEVEL	*2-5 / 00~7F:0~127
04	1C	SEQ1 Step[13]/CH[13] LEVEL	*2-5 / 00~7F:0~127
04	1D	SEQ1 Step[14]/CH[14] LEVEL	*2-5 / 00~7F:0~127
04	1E	SEQ1 Step[15]/CH[15] LEVEL	*2-5 / 00~7F:0~127
04	1F	SEQ1 Step[16]/CH[16] LEVEL	*2-5 / 00~7F:0~127
04	20	SEQ2 Step[01]/CH[01] PAN	*2-5 / *2-9
04	21	SEQ2 Step[02]/CH[02] PAN	*2-5 / *2-9
04	22	SEQ2 Step[03]/CH[03] PAN	*2-5 / *2-9
04	23	SEQ2 Step[04]/CH[04] PAN	*2-5 / *2-9
04	24	SEQ2 Step[05]/CH[05] PAN	*2-5 / *2-9
04	25	SEQ2 Step[06]/CH[06] PAN	*2-5 / *2-9
04	26	SEQ2 Step[07]/CH[07] PAN	*2-5 / *2-9
04	27	SEQ2 Step[08]/CH[08] PAN	*2-5 / *2-9
04	28	SEQ2 Step[09]/CH[09] PAN	*2-5 / *2-9
04	29	SEQ2 Step[10]/CH[10] PAN	*2-5 / *2-9

04	2A	SEQ2 Step[11]/CH[11]	PAN	*2-5 / *2-9
04	2B	SEQ2 Step[12]/CH[12]	PAN	*2-5 / *2-9
04	2C	SEQ2 Step[13]/CH[13]	PAN	*2-5 / *2-9
04	2D	SEQ2 Step[14]/CH[14]	PAN	*2-5 / *2-9
04	2E	SEQ2 Step[15]/CH[15]	PAN	*2-5 / *2-9
04	2F	SEQ2 Step[16]/CH[16]	PAN	*2-5 / *2-9

*2-1 : 00~15 : Up
 16~2A : Down
 2B~3F : Alt1
 40~55 : Alt2
 56~6A : Random
 6B~7F : Trigger

*2-2 : 00~07 : 0, 0, 1, 2, 3, 3, 4, 5
 08~0F : 6, 7, 7, 8, 9, 10, 11, 11
 10~17 : 12, 13, 14, 14, 15, 16, 17, 18
 18~1F : 18, 19, 20, 21, 22, 22, 23, 24
 20~27 : 25, 26, 26, 27, 28, 29, 29, 30
 28~2F : 31, 32, 33, 33, 34, 35, 36, 37
 30~37 : 37, 38, 39, 40, 41, 41, 42, 43
 38~3F : 44, 44, 45, 46, 47, 48, 48, 49
 40~47 : 50, 51, 52, 52, 53, 54, 55, 56
 48~4F : 56, 57, 58, 59, 59, 60, 61, 62
 50~57 : 63, 63, 64, 65, 66, 67, 67, 68
 58~5F : 69, 70, 71, 71, 72, 73, 74, 74
 60~67 : 75, 76, 77, 78, 78, 79, 80, 81
 68~6F : 82, 82, 83, 84, 85, 86, 86, 87
 70~77 : 88, 89, 89, 90, 91, 92, 93, 93
 78~7F : 94, 95, 96, 97, 97, 98, 99, 100

*2-3 : 00~0F : EG1	*2-4 : 00~0F : PITCH
10~1F : EG2	10~1F : OSC2PITCH
20~2F : LFO1	20~2F : OSC1CTRL1
30~3F : LFO2	30~3F : NOISE LEVEL
40~4F : VELOCITY	40~4F : CUTOFF
50~5F : KBD TRACK	50~5F : AMP
60~6F : MIDI1	60~6F : PAN
70~7F : MIDI2	70~7F : LFO2FREQ

*2-5 : When Knob is "Step Length" 00~7F : - 6~0~+ 6 (*2-6)
 When Knob is "Pitch" or "OSC2 Semi" 00~7F : -24~0~+24 (*2-7)
 When Knob is others 00~7F : -63~0~+63 (*2-8)

*2-6 : 00~09 : -6
 0A~13 : -5
 14~1D : -4
 1E~27 : -3
 28~31 : -2
 32~3B : -1
 3C~44 : 0
 45~4E : +1
 4F~58 : +2
 59~62 : +3
 63~6C : +4
 6D~76 : +5
 77~7F : +6

*2-7 : 00~07 : -24,-24,-24,-23,-23,-23,-22,-22
 08~0F : -21,-21,-21,-20,-20,-20,-19,-19
 10~17 : -18,-18,-18,-17,-17,-16,-16,-16
 18~1F : -15,-15,-15,-14,-14,-13,-13,-13
 20~27 : -12,-12,-11,-11,-11,-10,-10,-10
 28~2F : - 9,- 9,- 8,- 8,- 8,- 7,- 7,- 7
 30~37 : - 6,- 6,- 5,- 5,- 5,- 4,- 4,- 3
 38~3F : - 3,- 3,- 2,- 2,- 2,- 1,- 1, 0
 40~47 : 0, 0,+ 1,+ 1,+ 2,+ 2,+ 2,+ 3
 48~4F : + 3,+ 3,+ 4,+ 4,+ 5,+ 5,+ 5,+ 6
 50~57 : + 6,+ 7,+ 7,+ 7,+ 8,+ 8,+ 8,+ 9
 58~5F : + 9,+10,+10,+10,+11,+11,+11,+12
 60~67 : +12,+13,+13,+13,+14,+14,+15,+15
 68~6F : +15,+16,+16,+16,+17,+17,+18,+18
 70~77 : +18,+19,+19,+20,+20,+20,+21,+21
 78~7F : +21,+22,+22,+23,+23,+23,+24,+24

*2-8 : 00,01~7F = -63,-63~+63
 00~07 : -63,-63,-62,-61,-60,-59,-58,-57
 08~0F : -56,-55,-54,-53,-52,-51,-50,-49
 10~17 : -48,-47,-46,-45,-44,-43,-42,-41
 18~1F : -40,-39,-38,-37,-36,-35,-34,-33
 20~27 : -32,-31,-30,-29,-28,-27,-26,-25
 28~2F : -24,-23,-22,-21,-20,-19,-18,-17
 30~37 : -16,-15,-14,-13,-12,-11,-10,- 9
 38~3F : - 8,- 7,- 6,- 5,- 4,- 3,- 2,- 1
 40~47 : 0,+ 1,+ 2,+ 3,+ 4,+ 5,+ 6,+ 7
 48~4F : + 8,+ 9,+10,+11,+12,+13,+14,+15
 50~57 : +16,+17,+18,+19,+20,+21,+22,+23
 58~5F : +24,+25,+26,+27,+28,+29,+30,+31
 60~67 : +32,+33,+34,+35,+36,+37,+38,+39

68~6F : +40,+41,+42,+43,+44,+45,+46,+47
70~77 : +48,+49,+50,+51,+52,+53,+54,+55
78~7F : +56,+57,+58,+59,+60,+61,+62,+63

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*2-9 : 00,01~40~7F = L63,L63~CNT~R63
00~07 : L63,L63,L62,L61,L60,L59,L58,L57
08~0F : L56,L55,L54,L53,L52,L51,L50,L49
10~17 : L48,L47,L46,L45,L44,L43,L42,L41
18~1F : L40,L39,L38,L37,L36,L35,L34,L33
20~27 : L32,L31,L30,L29,L28,L27,L26,L25
28~2F : L24,L23,L22,L21,L20,L19,L18,L17
30~37 : L16,L15,L14,L13,L12,L11,L10,L09
38~3F : L08,L07,L06,L05,L04,L03,L02,L01
40~47 : CNT,R01,R02,R03,R04,R05,R06,R07
48~4F : R08,R09,R10,R11,R12,R13,R14,R15
50~57 : R16,R17,R18,R19,R20,R21,R22,R23
58~5F : R24,R25,R26,R27,R28,R29,R30,R31
60~67 : R32,R33,R34,R35,R36,R37,R38,R39
68~6F : R40,R41,R42,R43,R44,R45,R46,R47
70~77 : R48,R49,R50,R51,R52,R53,R54,R55
78~7F : R56,R57,R58,R59,R60,R61,R62,R63
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*3 :Panel Knob & Switch Control (assignable)

	Synth Mode	Vocoder Mode	
PITCH	Portamento		00~7F:0~127
OSC1	Wave	Wave	*3-1
	Controll1	Controll1	00~7F:0~127
	Control2	Control2	*3-2
OSC2	Wave		*3-3
(AudioIn2)	OSC Mod		*3-4
	Semitone	HPF Level	*2-7/00~7F:0~127
	Tune	Threshold	*2-8/00~7F:0~127
MIXER	OSC1 Level	OSC1 Level	00~7F:0~127
	OSC2 Level	Inst Level	00~7F:0~127
	Noise Level	Noise Level	00~7F:0~127
FILTER	Type	Formant Shift	*3-5/*3-6
	Cutoff	Cutoff	00~7F:0~127/*2-8
	Resonance	Resonance	00~7F:0~127
	EG1 Int	Mod Int	*2-8
	KBD Track	E.F.Sense	*2-8/00~7F:0~127
AMP	Level	Level	00~7F:0~127
	Panpot	Direct Level	*2-9/00~7F:0~127
	EG2/GATE		00~3F/40~7F:EG2/GATE
	Distortion	Distortion	00~3F/40~7F:OFF/ON
EG1	Attack	Attack	00~7F:0~127
	Decay	Decay	00~7F:0~127
	Sustain	Sustain	00~7F:0~127
	Release	Release	00~7F:0~127
EG2	Attack	Attack	00~7F:0~127
	Decay	Decay	00~7F:0~127
	Sustain	Sustain	00~7F:0~127
	Release	Release	00~7F:0~127
LFO1	Wave	Wave	*3-7
	Frequency	Frequency	*3-9
LFO2	Wave	Wave	*3-8
	Frequency	Frequency	*3-9
PATCH1	Intensity		*2-8
PATCH2	Intensity		*2-8
PATCH3	Intensity		*2-8
PATCH4	Intensity		*2-8
MOD FX	LFO Speed	LFO Speed	00~7F:0~127
	Depth	Depth	00~7F:0~127
DELAY FX	Delay Time	Delay Time	*3-10
	Depth	Depth	00~7F:0~127
Sync Control			00~3F/40~7F:No/Sync
Timbre Select			00/01~7F:Timbre1/2

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*3-1 : 00~0F : Saw      *3-3 : 00~2A : Saw      *3-4 : 00~1F : OFF
      10~1F : Pulse     2B~55 : Squ      20~3F : Ring
      20~2F : Tri       56~7F : Tri      40~5F : Sync
      30~3F : Sin                               60~7F : RingSync
      40~4F : Vox Wave
      50~5F : DWGS
      60~6F : Noise
      70~7F : Audio In
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*3-2 : When OSC1Wave isn't "DWGS"    00~7F : 0~127

        When OSC1Wave is "DWGS"        00,01 : DWGS Wave No. 1
                                         02,03 : 2
                                         ' '
                                         ' '
                                         7C,7D : DWGS Wave No.63
                                         7E,7F : 64

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*3-5 : 00~1F : 24LPP *3-6 : 00~19 : 0
 20~3F : 12LPP 1A~33 : +1
 40~5F : 12BPP 34~4C : +2
 60~7F : 12HPF 4D~66 : -1
 67~7F : -2

*3-7 : 00~1F : Saw *3-8 : 00~1F : Saw
 20~3F : Squ 20~3F : Squ(+)
 40~5F : Tri 40~5F : Sin
 60~7F : S/H 60~7F : S/H

*3-9 : When Tempo Sync is "OFF". 00~7F : 0~127

When Tempo Sync is "ON".

00~08 : 1/1	2B~33 : 1/3	56~5D : 3/32
09~11 : 3/4	34~3B : 1/4	5E~66 : 1/12
12~19 : 2/3	3C~44 : 3/16	67~6E : 1/16
1A~22 : 1/2	45~4C : 1/6	6F~77 : 1/24
23~2A : 3/8	4D~55 : 1/8	78~7F : 1/32

*3-10: When Tempo Sync is "OFF". 00~7F : 0~127

When Tempo Sync is "ON".

00~08 : 1/32	2B~33 : 1/8	56~5D : 3/8
09~11 : 1/24	34~3B : 1/6	5E~66 : 1/2
12~19 : 1/16	3C~44 : 3/16	67~6E : 2/3
1A~22 : 1/12	45~4C : 1/4	6F~77 : 3/4
23~2A : 3/32	4D~55 : 1/3	78~7F : 1/1

1-2 SYSTEM REALTIME MESSAGES

Status[H]	Description	
F8	Timing Clock	*4
FE	Active Sensing	

*4 : This message is transmitted when the "Clock" is set to "Internal".

1-3 UNIVERSAL SYSTEM EXCLUSIVE MESSAGES

DEVICE INQUIRY REPLY

Byte[H]	Description
F0	Exclusive Status
7E	Non Realtime Message
0g	MIDI Global Channel (Device ID)
06	General Information
02	Identity Reply
42	KORG ID (Manufacturers ID)
58	MS2000 Series ID (Family ID (LSB))
00	(Family ID (MSB))
mm	(Member ID (LSB))
00	(Member ID (MSB))
xx	(Minor Ver. (LSB))
xx	(Minor Ver. (MSB))
xx	(Major Ver. (LSB))
xx	(Major Ver. (MSB))
F7	END OF EXCLUSIVE

mm = 01 : MS2000
 08 : MS2000R

This message is transmitted whenever a INQUIRY MESSAGE REQUEST is received.

1-4 SYSTEM EXCLUSIVE MESSAGES

Function ID [Hex]	Description/Function	*5
40	CURRENT PROGRAM DATA DUMP	R,D,Me
4C	PROGRAM DATA DUMP	R,D
51	GLOBAL DATA DUMP	R,D
50	ALL DATA(PROGRAM,GLOBAL) DUMP	R,D
41	PROGRAM PARAMETER CHANGE	C
42	MODE DATA	M
26	DATA FORMAT ERROR	E
23	DATA LOAD COMPLETED	E
24	DATA LOAD ERROR	E
21	WRITE COMPLETED	E
22	WRITE ERROR	E

*5 : Transmitted when

R : Request message is received.

D : Data dump from MIDI dump page.

(Doesn't respond to MIDI FILTER "SystemEx" parameter.)
 E : Exclusive message is received.
 C : parameter is changed by -/+ Switch.
 M : Mode is changed.
 Me : Mode is changed to "LCD Edit".

2. RECOGNIZED RECEIVE DATA

2-1 CHANNEL MESSAGES

Status [Hex]	Second [H] [D]	Third [H] [D]	Description	
8n	kk (kk)	vv (vv)	Note Off vv=0~127	
9n	kk (kk)	00 (00)	Note Off	
9n	kk (kk)	vv (vv)	Note On vv=1~127	
Bn	01 (01)	vv (vv)	Pitch Modulation Depth	
Bn	02 (02)	vv (vv)	Breath Control Depth	
Bn	06 (06)	vv (vv)	Data Entry(MSB)	*6
Bn	0B (11)	vv (vv)	Expression	
Bn	40 (64)	vv (vv)	Sustain Off/On	
Bn	41 (65)	vv (vv)	Portamento Off/On	
Bn	62 (98)	nl (nl)	NRPN LSB	*6
Bn	63 (99)	nm (nm)	NRPN MSB	*6
Bn	78(120)	00 (0)	All Sound Off	
Bn	79(121)	00 (0)	Reset All Controllers	
Bn	7B(123)	00 (0)	All Note Off	
Bn	7C(124)	00 (0)	Omni Mode Off	
Bn	7D(125)	00 (0)	Omni Mode On	
Bn	cc (cc)	vv (vv)	Control Data cc=00~95	
Cn	pp (pp)	-- --	Program Change	
Dn	vv (vv)	-- --	Channel Pressure (After Touch)	
En	bb (bb)	bb (bb)	Pitch Bender Change	

n : MIDI Channel = 0 ~ F

vv : Value

*6 : Non Registered Parameter Number (NRPN)

MSB LSB [H] [H]	Parameter	Data Entry(MSB) Value
00 02	Arpeggio On/Off	00~3F/40~7F:OFF/ON
00 03	Arpeggio Octaves	00~03 :1~4 Oct.
00 04	Arpeggio Latch On/Off	00~3F/40~7F:OFF/ON
00 07	Arpeggio Type	*2-1
00 0A	Arpeggio Gate	*2-2
04 00	Patch1 Source/Fc Mod Source	*2-3 / *2-3
04 01	Patch2 Source	*2-3
04 02	Patch3 Source	*2-3
04 03	Patch4 Source	*2-3
04 08	Patch1 Destination	*2-4
04 09	Patch2 Destination	*2-4
04 0A	Patch3 Destination	*2-4
04 0B	Patch4 Destination	*2-4
04 10	SEQ1 Step[01]/CH[01] LEVEL	*2-5 / 00~7F:0~127
04 11	SEQ1 Step[02]/CH[02] LEVEL	*2-5 / 00~7F:0~127
04 12	SEQ1 Step[03]/CH[03] LEVEL	*2-5 / 00~7F:0~127
04 13	SEQ1 Step[04]/CH[04] LEVEL	*2-5 / 00~7F:0~127
04 14	SEQ1 Step[05]/CH[05] LEVEL	*2-5 / 00~7F:0~127
04 15	SEQ1 Step[06]/CH[06] LEVEL	*2-5 / 00~7F:0~127
04 16	SEQ1 Step[07]/CH[07] LEVEL	*2-5 / 00~7F:0~127
04 17	SEQ1 Step[08]/CH[08] LEVEL	*2-5 / 00~7F:0~127
04 18	SEQ1 Step[09]/CH[09] LEVEL	*2-5 / 00~7F:0~127
04 19	SEQ1 Step[10]/CH[10] LEVEL	*2-5 / 00~7F:0~127
04 1A	SEQ1 Step[11]/CH[11] LEVEL	*2-5 / 00~7F:0~127
04 1B	SEQ1 Step[12]/CH[12] LEVEL	*2-5 / 00~7F:0~127
04 1C	SEQ1 Step[13]/CH[13] LEVEL	*2-5 / 00~7F:0~127
04 1D	SEQ1 Step[14]/CH[14] LEVEL	*2-5 / 00~7F:0~127
04 1E	SEQ1 Step[15]/CH[15] LEVEL	*2-5 / 00~7F:0~127
04 1F	SEQ1 Step[16]/CH[16] LEVEL	*2-5 / 00~7F:0~127
04 20	SEQ2 Step[01]/CH[01] PAN	*2-5 / *2-9
04 21	SEQ2 Step[02]/CH[02] PAN	*2-5 / *2-9
04 22	SEQ2 Step[03]/CH[03] PAN	*2-5 / *2-9
04 23	SEQ2 Step[04]/CH[04] PAN	*2-5 / *2-9
04 24	SEQ2 Step[05]/CH[05] PAN	*2-5 / *2-9
04 25	SEQ2 Step[06]/CH[06] PAN	*2-5 / *2-9
04 26	SEQ2 Step[07]/CH[07] PAN	*2-5 / *2-9
04 27	SEQ2 Step[08]/CH[08] PAN	*2-5 / *2-9
04 28	SEQ2 Step[09]/CH[09] PAN	*2-5 / *2-9
04 29	SEQ2 Step[10]/CH[10] PAN	*2-5 / *2-9
04 2A	SEQ2 Step[11]/CH[11] PAN	*2-5 / *2-9
04 2B	SEQ2 Step[12]/CH[12] PAN	*2-5 / *2-9
04 2C	SEQ2 Step[13]/CH[13] PAN	*2-5 / *2-9
04 2D	SEQ2 Step[14]/CH[14] PAN	*2-5 / *2-9
04 2E	SEQ2 Step[15]/CH[15] PAN	*2-5 / *2-9

04	2F	SEQ2 Step[16]/CH[16] PAN	*2-5 / *2-9
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All these parameters can be changed by "Data Entry(MSB)".

2-2 SYSTEM REALTIME MESSAGES

Status[H]	Description	
F8	Timing Clock	*7
FA	Start	*7
FC	Stop (Arpeggiator stop)	*7
FE	Active Sensing	

*7 :This message is recognized when the "Clock" is set to "External" or "Auto".

2-3 UNIVERSAL SYSTEM EXCLUSIVE MESSAGE (NON REALTIME)

DEVICE INQUIRY MESSAGE REQUEST

Byte[H]	Description
F0	Exclusive Status
7E	Non Realtime Message
nn	MIDI Channel (Device ID)
06	General Information
01	Identity Request
F7	END OF EXCLUSIVE

nn : MIDI Channel = 0 ~ F :Global Channel
 = 7F :Any Channel

2-4 UNIVERSAL SYSTEM EXCLUSIVE MESSAGE (REALTIME)

(1) MASTER VOLUME

Byte[H]	Description
F0	Exclusive Status
7F	Realtime Message
nn	MIDI Channel (Device ID)
04	Device Control
01	Master Volume
vv	Value (LSB)
mm	Value (MSB)
F7	END OF EXCLUSIVE

nn : MIDI Channel = 0 ~ F :Global Channel
 = 7F :Any Channel
 mm,vv : 00,00 ~ 7F,7F :Min ~ Max

(2) MASTER FINE TUNE

Byte[H]	Description
F0	Exclusive Status
7F	Realtime Message
nn	MIDI Channel (Device ID)
04	Device Control
03	Master Fine Tune
vv	Value (LSB)
mm	Value (MSB)
F7	END OF EXCLUSIVE

nn : MIDI Channel = 0 ~ F : Global Channel
 = 7F : Any Channel
 mm,vv : 00,00~40,00~7F,7F : -100 ~ 0 ~ <+100

2-5 SYSTEM EXCLUSIVE MESSAGE

Function ID [Hex]	Function
10	CURRENT PROGRAM DATA DUMP REQUEST
1C	PROGRAM DATA DUMP REQUEST
0E	GLOBAL DATA DUMP REQUEST
0F	ALL DATA(PROGRAM,GLOBAL) DUMP REQUEST
12	MODE REQUEST
40	CURRENT PROGRAM DATA DUMP
4C	PROGRAM DATA DUMP
51	GLOBAL DATA DUMP
50	ALL DATA(PROGRAM,GLOBAL) DUMP

11	PROGRAM WRITE REQUEST
41	PARAMETER CHANGE
4E	MODE CHANGE

When the "SystemEx" parameter is set to "ENA", these messages are recognized.

MIDI EXCLUSIVE FORMAT (R:Receive, T:Transmit)

(1) MODE REQUEST		R
Byte	Description	
F0,42,3g,58	EXCLUSIVE HEADER	
0001 0010 (12)	MODE REQUEST	12H
1111 0111 (F7)	EOX	

Receive this message, and transmits Func=42 message.

(2) CURRENT PROGRAM DATA DUMP REQUEST		R
Byte	Description	
F0,42,3g,58	EXCLUSIVE HEADER	
0001 0000 (10)	CURRENT PROGRAM DATA DUMP REQUEST	10H
1111 0111 (F7)	EOX	

Receive this message, and transmits Func=40 or Func=24 message.

(3) PROGRAM DATA DUMP REQUEST		R
Byte	Description	
F0,42,3g,58	EXCLUSIVE HEADER	
0001 1100 (1C)	PROGRAM DATA DUMP REQUEST	1CH
1111 0111 (F7)	EOX	

Receive this message, and transmits Func=4C or Func=24 message.

(4) GLOBAL DATA DUMP REQUEST		R
Byte	Description	
F0,42,3g,58	EXCLUSIVE HEADER	
0000 1110 (0E)	GLOBAL DATA DUMP REQUEST	0EH
1111 0111 (F7)	EOX	

Receive this message, and transmits Func=51 or Func=24 message.

(5) ALL DATA DUMP REQUEST		R
Byte	Description	
F0,42,3g,58	EXCLUSIVE HEADER	
0000 1111 (0F)	ALL DATA DUMP REQUEST	0FH
1111 0111 (F7)	EOX	

Receive this message, and transmits Func=50 or Func=24 message.

(6) PROGRAM WRITE REQUEST		R
Byte	Description	
F0,42,3g,58	EXCLUSIVE HEADER	
0001 0001 (11)	PROGRAM WRITE REQUEST	11H
0000 0000 (00)		
0ppp pppp (pp)	Destination Program No.(0~127)	
1111 0111 (F7)	EOX	

Receive this message, and transmits Func=21 or Func=22 message.

(7) CURRENT PROGRAM DATA DUMP		R/T
Byte	Description	
F0,42,3g,58	EXCLUSIVE HEADER	
0100 0000 (40)	CURRENT PROGRAM DATA DUMP	40H
0ddd dddd (dd)	Data	(NOTE 1,6)

:	:
1111 0111 (F7)	EOX

Receive this message & data, save them to Edit Buffer and transmits Func=23 or Func=24 message.
 Receive Func=10 message, and transmits this message & data from Edit Buffer.
 When Enter the LCD Edit Mode, transmit this message & data from Edit Buffer.

(8) PROGRAM DATA DUMP		R/T
Byte	Description	
F0,42,3g,58	EXCLUSIVE HEADER	
0100 1100 (4C)	PROGRAM DATA DUMP	4CH
0ddd dddd (dd)	Data	(NOTE 2,6)
:	:	
1111 0111 (F7)	EOX	

Receive this message & data, save them to Internal Memory and transmits Func=23 or Func=24 message.
 Receive Func=1C message, and transmits this message & data from Internal Memory.
 When DATA DUMP is executed, transmit this message & data from Internal Memory.

(9) GLOBAL DATA DUMP		R/T
Byte	Description	
F0,42,3g,58	EXCLUSIVE HEADER	
0101 0001 (51)	GLOBAL DATA DUMP	51H
0ddd dddd (dd)	Data	(NOTE 3,6)
:	:	
1111 0111 (F7)	EOX	

Receive this message & data, save them to Internal Memory and transmits Func=23 or Func=24 message.
 Receive Func=0E message, and transmits this message & data from Edit Buffer.
 When DATA DUMP is executed, transmit this message & data from Edit Buffer.

(10) ALL DATA DUMP		R/T
Byte	Description	
F0,42,3g,58	EXCLUSIVE HEADER	
0101 0000 (50)	ALL DATA DUMP	50H
0ddd dddd (dd)	Data	(NOTE 4,6)
:	:	
1111 0111 (F7)	EOX	

Receive this message & data, save them to Internal Memory and transmits Func=23 or Func=24 message.
 Receive Func=0F message, and transmits this message & data from Internal Memory or Edit Buffer(GLOBAL).
 When DATA DUMP is executed, transmit this message & data from Internal Memory or Edit Buffer(GLOBAL).

(11) MODE CHANGE		R/T
Byte	Description	
F0,42,3g,58	EXCLUSIVE HEADER	
0100 1110 (4E)	MODE CHANGE	4EH
0000 00mm (0m)	Mode Data	(NOTE 5)
0000 0000 (00)		
1111 0111 (F7)	EOX	

Receive this message & data, changes the Mode. and transmits Func=23 or Func=24 message.
 When the Mode is changed by Switch, transmit this message & data.

(12) PARAMETER CHANGE		R/T
Byte	Description	
F0,42,3g,58	EXCLUSIVE HEADER	
0100 0001 (41)	PARAMETER CHANGE	41H
0ppp pppp (pp)	Parameter ID (LSB bit 6~0)	(NOTE 7)
0ppp pppp (pp)	Parameter ID (MSB bit13~7)	' '
0vvv vvvv (vv)	Value (LSB bit 6~0)	' '
0vvv vvvv (vv)	Value (MSB bit13~7)	' '
1111 0111 (F7)	EOX	

Receive this message & data, select & change a Parameter and transmits Func=23 or Func=24 message.
 When the Parameter is changed by Switch & Knob, transmit this message & data.

(13) MODE DATA		T
----------------	--	---

Byte	Description	
F0,42,3g,58	EXCLUSIVE HEADER	
0100 0010 (42)	MODE DATA	42H
0000 00mm (0m)	Mode Data	(NOTE 5)
0000 0000 (00)		
0000 0000 (00)		
0000 0000 (00)		
0000 0100 (04)		
1111 0111 (F7)	EOX	

Receive Func=12 message, and transmits this message & data .

(14) RECEIVE DATA FORMAT ERROR T

Byte	Description	
F0,42,3g,58	EXCLUSIVE HEADER	
0010 0110 (26)	DATA FORMAT ERROR	26H
1111 0111 (F7)	EOX	

When found an error in the received message (ex.data length), transmits this message.

(15) DATA LOAD COMPLETED (ACK) T

Byte	Description	
F0,42,3g,58	EXCLUSIVE HEADER	
0010 0011 (23)	DATA LOAD COMPLETED	23H
1111 0111 (F7)	EOX	

When DATA LOAD,PROCESSING have been completed, transmits this message.

(16) DATA LOAD ERROR (NAK) T

Byte	Description	
F0,42,3g,58	EXCLUSIVE HEADER	
0010 0100 (24)	DATA LOAD ERROR	24H
1111 0111 (F7)	EOX	

When DATA LOAD,PROCESSING have not been completed (ex.protect), transmits this message.

(17) WRITE COMPLETED T

Byte	Description	
F0,42,3g,58	EXCLUSIVE HEADER	
0010 0001 (21)	WRITE COMPLETED	21H
1111 0111 (F7)	EOX	

When DATA WRITE MIDI has been completed, transmits this message.

(18) WRITE ERROR T

Byte	Description	
F0,42,3g,58	EXCLUSIVE HEADER	
0010 0010 (22)	WRITE ERROR	22H
1111 0111 (F7)	EOX	

When DATA WRITE MIDI has not been completed, transmits this message.

NOTE 1: CURRENT PROGRAM DATA (IN CURRENT BUFFER) DUMP FORMAT
 254Bytes = 7*36+2 -> 8*36+(1+2) => 291Bytes
 (TABLE 1)

NOTE 2: PROGRAM DATA (IN INTERNAL MEMORY) DUMP FORMAT
 [Prog A01(254Bytes)],..., [Prog H16(254Bytes)]
 254*128Bytes = 7*4644+4 -> 8*4644+(1+4) => 37157Bytes
 (TABLE 5)

NOTE 3: GLOBAL DATA (IN INTERNAL MEMORY) DUMP FORMAT
 200Bytes = 7*28+4 -> 8*28+(1+4) => 229Bytes
 (TABLE 6)

NOTE 4: ALL DATA (IN INTERNAL MEMORY) DUMP FORMAT
 [Prog A01(254Bytes)],..., [Prog H16(254Bytes)], [Global Data].
 254*128+200Bytes= 7*4673+1 -> 8*4673+(1+1) => 37386Bytes

(TABLE 7)

NOTE 5: m = 0 : Program Play
 1 : LCD Edit
 2 : Global

NOTE 6: The dump data conversion

```

DATA ( 1set = 8bit x 7Byte )
b7 ~ b0 b7 ~ b0 b7 ~ b0 b7 ~ b0
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
7n+0 7n+1 7n+2 ~ 7n+5 7n+6

MIDI DATA ( 1set = 7bit x 8Byte )
b7b7b7b7b7b7b7 b6 ~ b0 b6 ~ b0 b6 ~ b0
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
| 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
7n+6,5,4,3,2,1,0 7n+0 7n+1 ~ 7n+5 7n+6

```

NOTE 7: MIDI Parameter Change Message Format
 F0,42,3n,58,4l,pp,PP,vv,VV,F7
 n :Global MIDI Ch.
 58 :MS2000 ID

parameter No. :PPpp = 0~3FFF
 parameter value :VVvv = signed value

VV(PP):0MMMMMM vv(pp):0LLLLLLL value(No.):MMMMMM MLLLLLLL

(See the parameter lists. : TABLE 8)

TABLE 1 : PROGRAM PARAMETER (1 PROGRAM, CURRENT PROGRAM)

0~11	program name	ASCII code [0]~[15]=1st~12th
12~15	(not use)	
16 B6,7	Timbre Voice	0~2=1+3,2+2,3+1 (use Split/Dual Mode)
B4,5	Voice Mode	0~3=Single,Split,Layer,Vocoder
B0~3	not use	(0,0,0,0)
17 B4~7	Scale Key	0~11=C,C#,D,D#,E,F,F#,G,G#,A,A#,B
B0~3	Scale Type	0~9=Equal Temp~User Scale *T-1
18	Split Point (upper btm)	0~127=C-1~G9 (use Split Mode)
DELAY FX		
19 B7	Sync	0,1=Off,On
B4~6	not use	(0,0,0)
B0~3	Time Base	0~14=1/32~1/1 *T-2
20	Delay Time	0~127
21	Depth	0~127
22	Type	0~2=StereoDelay,CrossDelay, L/R Delay
MOD FX		
23	LFO Speed	0~127
24	Depth	0~127
25	Type	0~2=Cho/Flg,Ensemble,Phaser
EQ		
26	Hi Freq	0~29=1.00~18.0 [KHz] *T-12
27	Hi Gain	64+/-12=0+/-12
28	Low Freq	0~29=40~1000 [Hz] *T-13
29	Low Gain	64+/-12=0+/-12
ARPEGGIO		

30		tempo (MSB)	20~300	
31		(LSB)	(SEQ tempo)	
32	B7	Arpeggio On/Off	0,1=Off,On	
	B6	Latch	0,1=Off,On	
	B4,5	Target	0~2=Both,Timb1,Timb2	
	B1	not use	(0)	
	B0	Key Sync	0,1=Off,On	
33	B0~3	Type	0~5=Up~Trigger	*T-14
	B4~7	Range	0~3=1~4 Octave	
34		gate time	0~100=0~100[%]	
35		Resolution	0~5=1/24,1/16,1/12,1/8,1/6,1/4	
36		Swing	0+/-100=0+/-100[%]	
37		(dummy byte)		
Synth parameter (Mode = Single,Split,Dual)				
38~145		TIMBRE1 DATA	Timbre parameter	(TABLE 2)
Synth parameter (Mode = Split,Dual)				
146~253		TIMBRE2 DATA	Timbre parameter	(TABLE 2)
Vocoder parameter (Mode = Vocoder)				
38~115		VOCODER DATA	Vocoder parameter	(TABLE 4)
116~253		(dummy bytes)		

TABLE 2 : SYNTH PARAMETER (1 TIMBRE)

+0		MIDI ch.	-1,0~15=GLB,1~16ch	
+1	B6,7	Assign Mode	0,1,2=Mono,Poly,Unison	
	B5	EG2 reset	0,1=Off,On	
	B4	EG1 reset	0,1=Off,On	
	B3	Trigger Mode	0,1=Single,Multi (use Mono/Unison Mode)	
	B0~1	Key Priority	0~2=Last,Low,High	
+2		Unison Detune	0~99=0~99[cent] (use Unison Mode)	
PITCH				
+3		Tune	64+/-50=0+/-50[cent]	
+4		Bend Range	64+/-12=0+/-12[note]	
+5		Transpose	64+/-24=0+/-24[note]	
+6		Vibrato Int	64+/-63=0+/-63	
OSC1				
+7		Wave	0~7=Saw~Audio In	*T-3
+8		Waveform CTRL1	0~127	
+9		Waveform CTRL2	0~127	
+10		DWGS Wave	0~63=DWGS No. 1~64 (when OSC1 Wave is "DWGS")	
+11		(dummy byte)		
OSC2				
+12	B6,7	not use	(0,0)	
	B4,5	Mod Select	0~3=Off, Ring, Sync, RingSync	
	B2,3	not use	(0,0)	
	B0,1	Wave	0~2=Saw,Squ,Tri	
+13		Semitone	64+/-24=0+/-24[note]	

+14		Tune	64+/-63=0+/-63
PITCH (2)			
+15	B7	not use	(0)
	B0~6	Portamento Time	0~127
MIXER			
+16		OSC1 Level	0~127
+17		OSC2 Level	0~127
+18		Noise	0~127
FILTER			
+19		Type	0~3=24LPF,12LPF,12BPF,12HPF
+20		Cutoff	0~127
+21		Resonance	0~127
+22		EG1 Intensity	64+/-63=0+/-63
+23		Velocity Sense	64+/-63=0+/-63
+24		Keyboard Track	64+/-63=0+/-63
AMP			
+25		Level	0~127
+26		Panpot	0~64~127=L64~CNT~R63
+27	B7	not use	(0)
	B6	Amp SW	0,1=EG2,Gate
	B1~5	not use	(0,0,0,0,0)
	B0	Distortion	0,1=Off,On
+28		Velocity Sense	64+/-63=0+/-63
+29		Keyboard Track	64+/-63=0+/-63
EG1			
+30		Attck	0~127
+31		Decay	0~127
+32		Sustain	0~127
+33		Release	0~127
EG2			
+34		Attack	0~127
+35		Decay	0~127
+36		Sustain	0~127
+37		Release	0~127
LFO1			
+38	B6,7	not use	(0,0)
	B4,5	Key Sync	0~2=OFF,Timbre,Voice
	B2,3	not use	(0,0)
	B0,1	Wave	0~3=Saw,Squ,Tri,S/H
+39		Frequency	0~127
+40	B7	Tempo Sync	0,1=Off,On
	B5,6	not use	(0,0)
	B0~4	Sync Note	0~14=1/1~1/32 *T-6
LFO2			
+41	B6,7	not use	(0,0)

	B4,5	Key Sync	0~2=OFF, Timbre, Voice	
	B2,3	not use	(0,0)	
	B0,1	Wave	0~3=Saw, Squ(+), Sin, S/H	
+42		Frequency	0~127	
+43	B7	Tempo Sync	0,1=Off, On	
	B5,6	not use	(0,0)	
	B0~4	Sync Note	0~14=1/1~1/32	*T-6
PATCH				
+44	B4~7	Patch1 Destination	0~7=PITCH~LFO2FREQ	*T-5
	B0~3	Patch1 Source	0~7=EG1~MIDI2	*T-4
+45		Patch1 Intensity	64+/-63=0+/-63	
+46	B4~7	Patch2 Destination	0~7=PITCH~LFO2FREQ	*T-5
	B0~3	Patch2 Source	0~7=EG1~MIDI2	*T-4
+47		Patch2 Intensity	64+/-63=0+/-63	
+48	B4~7	Patch3 Destination	0~7=PITCH~LFO2FREQ	*T-5
	B0~3	Patch3 Source	0~7=EG1~MIDI2	*T-4
+49		Patch3 Intensity	64+/-63=0+/-63	
+50	B4~7	Patch4 Destination	0~7=PITCH~LFO2FREQ	*T-5
	B0~3	Patch4 Source	0~7=EG1~MIDI2	*T-4
+51		Patch4 Intensity	64+/-63=0+/-63	
SEQ				
+52	B7	SEQ On/Off	0,1=Off, On	
	B6	Run Mode	0,1=1Shot, Loop (only Loop when KeySync is "OFF".)	
	B5	not use	(0)	
	B0~4	Resolution	0~15=1/48~1/1	*T-7
+53	B4~7	Last Step	0~15=1~16	
	B2,3	Seq Type	0~3=Fowrd, Reverse, Alt1, Alt2	
	B0,1	Key Sync	0~2=OFF, Timbre, Voice	
+54~71		SEQ1 parameter	SEQ parameter [18]	(TABLE 3)
+72~89		SEQ2 parameter	SEQ parameter [18]	(TABLE 3)
+90~107		SEQ3 parameter	SEQ parameter [18]	(TABLE 3)

TABLE 3 : SEQ PARAMETER

+0		Knob	0~30=None~Patch4Int	*T-10
+1	B1~7	not use	(0,0,0,0,0,0,0)	
	B0	Motion Type	0,1=Smooth, Step	
+2~17		Step Value [0~15]	64+/-63=0+/-63	

TABLE 4 : VOCODER PARAMETER

+0		MIDI ch.	-1,0~15=GLB, 1~16ch	
+1	B6,7	Assign Mode	0,1,2=Mono, Poly, Unison	
	B5	EG2 reset	0,1=Off, On	
	B4	EG1 reset	0,1=Off, On	
	B3	Trigger Mode	0,1=Single, Multi (use Mono/Unison Mode)	
	B0~1	Key Priority	0~2=Last, Low, High	
+2		Unison Detune	0~99=0~99[cent] (use Unison Mode)	

PITCH			
+3	Tune	64+/-50=0+/-50[cent]	
+4	Bend Range	64+/-12=0+/-12[note]	
+5	Transpose	64+/-24=0+/-24[note]	
+6	Vibrato Int	64+/-63=0+/-63	
OSC			
+7	Wave	0~7=Saw~Audio In	*T-3
+8	Waveform CTRL1	0~127	
+9	Waveform CTRL2	0~127	
+10	DWGS Wave	0~63=DWGS No. 1~64 (when OSC Wave is "DWGS")	
+11	(dummy byte)		
AUDIO IN2			
+12	B1~7	not use	(0,0,0,0,0,0,0)
	B0	HPF Gate	0,1=Dis,Ena
+13	(dummy byte)		
PITCH (2)			
+14	B7	not use	(0)
	B0~6	Portamento Time	0~127
MIXER			
+15	OSC1 Level	0~127	
+16	Ext1 Level	0~127	
+17	Noise Level	0~127	
AUDIO IN2 (2)			
+18	HPF Level	0~127	
+19	Gate Sense	0~127	
+20	Threshold	0~127	
FILTER			
+21	Shift	0~4=0,+1,+2,-1,-2	
+22	Cutoff	64+/-63=0+/-63	
+23	Resonance	0~127	
+24	Mod Source	0~7=EG1~MIDI2	*T-4
+25	Intensity	64+/-63=0+/-63	
+26	E.F.Sense	0~127	
AMP			
+27	Level	0~127	
+28	Direct Level	0~127	
+29	B1~7	not use	(0,0,0,0,0,0,0)
	B0	Distortion On/Off	0,1=Off,On
+30	Vel.Sense	64+/-63=0+/-63	
+31	KeyTrack	64+/-63=0+/-63	
EG1			
+32	Attack	0~127	
+33	Decay	0~127	
+34	Sustain	0~127	
+35	Release	0~127	

EG2			
+36	Attack	0~127	
+37	Decay	0~127	
+38	Sustain	0~127	
+39	Release	0~127	
LFO1			
+40	B6,7	not use	(0,0)
	B4,5	Key Sync	0~2=OFF, Timbre, Voice
	B2,3	not use	(0,0)
	B0,1	Wave	0~3=Saw, Squ, Tri, S/H
+41	Frequency	0~127	
+42	B7	Tempo Sync	0,1=Off, On
	B5,6	not use	(0,0)
	B0~4	Sync Note	0~14=1/1~1/32 *T-6
LFO2			
+43	B6,7	not use	(0,0)
	B4,5	Key Sync	0~2=OFF, Timbre, Voice
	B2,3	not use	(0,0)
	B0,1	Wave	0~3=Saw, Squ(+), Sin, S/H
+44	Frequency	0~127	
+45	B7	Tempo Sync	0,1=Off, On
	B5,6	not use	(0,0)
	B0~4	Sync Note	0~14=1/1~1/32 *T-6
CH LEVEL [0]~[15]=CH[1]~[16]			
+46~61	Level [0~15]	0~127	
CH PAN [0]~[15]=CH[1]~[16]			
+62~77	Pan [0~15]	1~64~127=L63~CNT~R63	

TABLE 5 : ALL PROGRAM PARAMETER

000~ 253	Prog A01	(TABLE 1)
254~ 507	Prog A02	(TABLE 1)
508~ 761	Prog A03	(TABLE 1)
32004~32257	Prog H15	(TABLE 1)
32258~32511	Prog H16	(TABLE 1)

TABLE 6 : GLOBAL PARAMETER

0	Master Tune	0+/-100=430~440~450
1	Transpose	0+/-12
2	B1~7	not use (0,0,0,0,0,0,0)
	B0	Position 0,1=PostKBD, PreTG
3	Vel.Value	1~127=1~127
4	Vel.Curve	0~7,8=1~8, Const
5	B4~7	not use (0,0,0,0)
	B3	Panel Page Jump 0,1=Off, On

	B2	Local Ctrl	0,1=Off,On
	B1	Page Memory	0,1=Off,On
	B0	Memory Protect	0,1=Off,On
6	B7	Ass.SW Polarity	0,1= -, +
	B6	Ass.SW Mode	0,1=Unlatch,Latch
	B4,5	not use	(0,0)
	B0~3	Ass.SW	0~6=Damper~Arpeggio Off/On *T-8
7	B3~7	not use	(0,0,0,0,0)
	B0~2	Ass.Pedal	0~5=Volume~FootPdl *T-9
8	B2~7	not use	(0,0,0,0,0,0)
	B0,1	Clock	0~2=Internal,External,Auto
9	B4~7	not use	(0,0,0,0)
	B0~3	MIDI Ch.	0~15=1~16
10		Sync Ctrl No.	-1,0~95=OFF,CC#00~95
11		TimbSel Ctrl No.	-1,0~95=OFF,CC#00~95
12~13		(dummy bytes)	
14		MIDI1 Ctrl No.	0~97=P.Bend,A.Touch,CC#00~95
15		MIDI2 Ctrl No.	0~97=P.Bend,A.Touch,CC#00~95
16	B7	SystemEx Filter	0,1=Dis,Ena
	B2~6	not use	(0,0,0,0,0)
	B0,1	Note Receive	0~2(,3)=All,Evn,Odd(,OFF)
17	B7	not use	(0)
	B6	P.Bend Filter	0,1=Dis,Ena
	B3~5	not use	(0,0,0)
	B2	CtrlChg Filter	0,1=Dis,Ena
	B0	ProgChg Filter	0,1=Dis,Ena
Knob & Switch Ctrl Change No. Map			
18~59	[0]~[41]	Ctrl Change No.	-1,0~95=OFF,CC#00~95 *T-11
User Scale Parameter			
60~71	User Scale[C]~[B]		0+/-100=+/-100cent
MIDI In Programme Change Map			
72~199	P.Chg[000]~[127]	Internal Prog No.	[000]~[127]=MIDI In P.Chg 00~7F -1,0~127=OFF,A01~H16

TABLE 7 : ALL PARAMETER

000~32511	ALL PROGRAM DATA	Prog A01~H16	(TABLE 5)
32512~32711	GLOBAL DATA		(TABLE 6)

TABLE 8 : Parameter List

No.	Parameter Name	value
000~00B	Name 1st~12th	20h~7Fh=" " ~Left Arrow
00C~00F	none	
010	Voice Mode	0~3=Single,Split.Dual,Vocoder
011	Split Point (upper btm)	0~127=C-1~G9 (use Split Mode)
012	Timbre Voice	0~2=1+3,2+2,3+1 (use Split/Dual Mode)

013	Scale Type	0~9=Equal Temp~User Scale *T-1
014	Scale Key	0~11=C,C#,D,D#,E,F,F#,G,G#,A,A#,B
DELAY FX		
015	Type	0~2=Stereo,Cross,L/R Delay
016	Delay Time	0~127=0~127
017	Depth	0~127=0~127
MOD FX		
018	Type	0~2=Cho/Flg,Ensemble,Phaser
019	LFO Speed	0~127=0~127
01A	Depth	0~127=0~127
ARPEGGIO		
01B	Arpeggio On/Off	0,1=Off,On
01C	Type	0~5=Up~Trigger *T-14
01D	Range	0~3=1~4 Octave
01E	Latch	0,1=Off,On
01F	Tempo	20~300=20~300
020	Gate Time	0~100=0~100[%]
021	Target	0~2(,3)=Both,Timb1,Timb2 (,OFF)
022	Key Sync	0,1=Off,On
023	Resolution	0~5=1/24,1/16,1/12,1/8,1/6,1/4
024	Swing	-100~0~+100=-100~0~+100[%]
EQ		
025	Hi Freq	0~29=1.00~18.0 [KHz] *T-12
026	Hi Gain	-12~0~+12=-12~0~+12
027	Low Freq	0~29=40~1000 [Hz] *T-13
028	Low Gain	-12~0~+12=-12~0~+12
DELAY FX (2)		
029	Tempo Sync	0,1=Off,On
02A	Sync Note	0~14=1/32~1/1 *T-2
02B~03F	none	
Synth Parameter (Mode = Single,Split,Dual)		
040~0CF	Timbre1 parameter	(TABLE 10, No. offset=040)
Synth Parameter (Mode = Split,Dual)		
0D0~15F	Timbre2 parameter	(TABLE 10, No. offset=0D0)
Vocoder Parameter (Mode = Vocoder)		
160~1CF	Vocoder parameter	(TABLE 11, No. offset=160)

TABLE 10 : Synth Timbre Parameter (No. offset=040/No. offset=0D0)

No. offset	Parameter Name	value
VOICE		
+00	Voice Assign	0~2=Mono,Poly,Unison
+01	Trig Mode	0,1=Single,Multi
+02	Unison Detune	0~99=0~99[cent] (when Voice Assign is "Unison")
+03	Timb MIDI Ch.	-1,0~15=GLB,Ch1~Ch16
PITCH		

+04	Transpose	-24~0~+24=-24~0~+24[note]
+05	Tune	-50~0~+50=-50~0~+50[cent]
+06	Vibrato Int	-63~0~+63=-63~0~+63
+07	Portamento Time	0~127=0~127
+08	Bend Range	-12~0~+12=-12~0~+12[note]
OSC1		
+09	OSC1 Wave	0~7=Saw~Audio In *T-3
+0A	Waveform CTRL1	0~127=0~127
+0B	Waveform CTRL2	0~127=0~127
+0C	DWGS Wave	0~63=DWGS No. 1~64 (when OSC1 Wave is "DWGS")
OSC2		
+0D	OSC2 Wave	0~2=Saw,Squ,Tri
+0E	Mod Select	0~3=OFF, Ring, Sync, RingSync
+0F	Semitone	-24~0~+24=-24~0~+24[note]
+10	Tune	-63~0~+63=-63~0~+63
MIXER		
+11	OSC1 Level	0~127=0~127
+12	OSC2 Level	0~127=0~127
+13	Noise Level	0~127=0~127
FILTER		
+14	Type	0~3=24LPF,12LPF,12BPF,12HPF
+15	Cutoff	0~127=0~127
+16	Resonance	0~127=0~127
+17	EG1Int	-63~0~+63=-63~0~+63
+18	KBD Track	-63~0~+63=-63~0~+63
AMP		
+19	Level	0~127=0~127
+1A	Panpot	-63~0~+63=L63~CNT~R63
+1B	Amp Sw	0,1=EG2,GATE
+1C	Distortion	0,1=Off,On
+1D	KBD Track	-63~0~+63=-63~0~+63
EG1		
+1E	Attack	0~127=0~127
+1F	Decay	0~127=0~127
+20	Sustain	0~127=0~127
+21	Release	0~127=0~127
+22	Fc Vel Sense	-63~0~+63=-63~0~+63
EG2		
+23	Attack	0~127=0~127
+24	Decay	0~127=0~127
+25	Sustain	0~127=0~127
+26	Release	0~127=0~127
+27	Amp Vel Sense	-63~0~+63=-63~0~+63
LFO1		
+28	Wave	0~3=Saw,Squ,Tri,S/H

+29	Frequency	0~127=0~127	
+2A	Sync Note	0~14=1/1~1/32	*T-6
+2B	Tempo Sync	0,1=Off,On	
+2C	Key Sync	0~2=OFF, Timbre, Voice	
LFO2			
+2D	Wave	0~3=Saw, Squ(+), Sin, S/H	
+2E	Frequency	0~127=0~127	
+2F	Sync Note	0~14=1/1~1/32	*T-6
+30	Tempo Sync	0,1=Off,On	
+31	Key Sync	0~2=OFF, Timbre, Voice	
PATCH			
+32	PATCH1 Source	0~7=EG1~MIDI2	*T-4
+33	PATCH1 Destination	0~7=PITCH~LFO2FREQ	*T-5
+34	PATCH1 Intensity	-63~0~+63=-63~0~+63	
+35	PATCH2 Source	0~7=EG1~MIDI2	*T-4
+36	PATCH2 Destination	0~7=PITCH~LFO2FREQ	*T-5
+37	PATCH2 Intensity	-63~0~+63=-63~0~+63	
+38	PATCH3 Source	0~7=EG1~MIDI2	*T-4
+39	PATCH3 Destination	0~7=PITCH~LFO2FREQ	*T-5
+3A	PATCH3 Intensity	-63~0~+63=-63~0~+63	
+3B	PATCH4 Source	0~7=EG1~MIDI2	*T-4
+3C	PATCH4 Destination	0~7=PITCH~LFO2FREQ	*T-5
+3D	PATCH4 Intensity	-63~0~+63=-63~0~+63	
VOICE (2)			
+3E	Voice Priority	0~2=Last, Low, High	
+3F	none		
SEQ COMMON			
+40	SEQ On/Off	0,1=Off,On	
+41	Last Step	0~15=Step1~16	
+42	Type	0~3=Forward, Reverse, Alt1, Alt2	
+43	Run Mode	0,1=1Shot, Loop	(NOTE 10)
+44	Key Sync	0~2=OFF, Timbre, Voice	
+45	Resolution	0~15=1/48~1/1	*T-7
SEQ1			
+46	Knob	0~30=None~Patch4Int	*T-10
+47	Motion Type	0,1=Smooth, Step	(NOTE 8)
+48~+57	Value Step1~16	-63~0~+63=-63~0~+63	(NOTE 9)
SEQ2			
+58	Knob	0~30=None~Patch4Int	*T-10
+59	Motion Type	0,1=Smooth, Step	(NOTE 8)
+5A~69	Value Step1~16	-63~0~+63=-63~0~+63	(NOTE 9)
SEQ3			
+6A	Knob	0~30=None~Patch4Int	*T-10
+6B	Motion Type	0,1=Smooth, Step	(NOTE 8)
+6C~+7B	Value Step1~16	-63~0~+63=-63~0~+63	(NOTE 9)

+7C	EG1 EG Reset	0,1=Off,On
+7D	EG2 EG Reset	0,1=Off,On
+7E,7F	none	
+80	(SEQ1 step select)	0~15=[01]~[16]
+81	(SEQ2 step select)	0~15=[01]~[16]
+82	(SEQ3 step select)	0~15=[01]~[16]
+83~8F	none	

NOTE 8 : if destination=OSC1CTRL2 and OSC1 Wave=DWGS, value:1 (Step) only.

NOTE 9 : if destination=Pitch, value:-24~0~+24 (-24~0~+24).
if destination=step length, value: -6~0~ +6 (-6~0~ +6).

NOTE 10: if Key Sync=OFF, Loop only.

TABLE 11 : Vocoder Parameter (No. offset=160)

No. offset	Parameter Name	value
VOICE		
+00	Voice Assign Mode	0~2=Mono,Poly,Unison
+01	Trig Mode	0,1=Single,Multi
+02	Unison Detune	0~99=0~99[cent] (when Voice Assign is "Unison")
+03	Timbre MIDI Ch.	-1,0~15=GLB,Ch1~Ch16
+04~07	none	
PITCH		
+08	Transpose	-24~0~+24=-24~0~+24[note]
+09	Tune	-50~0~+50=-50~0~+50[cent]
+0A	Vibrato Int	-63~0~+63=-63~0~+63
+0B	Portamento Time	0~127=0~127
+0C	Bend Range	-12~0~+12=-12~0~+12[note]
+0D~+0F	none	
OSC		
+10	Wave	0~7=Saw~Audio In *T-3
+11	Waveform CTRL1	0~127=0~127
+12	Waveform CTRL2	0~127=0~127
+13	DWGS Wave	0~63=DWGS No. 1~64 (when OSC Wave is "DWGS")
+14~+17	none	
MIXER		
+18	OSC1 Level	0~127=0~127
+19	Inst Level	0~127=0~127
+1A	Noise Level	0~127=0~127
AUDIO IN2		
+1B	HPF Level	0~127=0~127
+1C	Gate Sense	0~127=0~127
+1D	Threshold	0~127=0~127
+1E	HPF Gate	0,1=Off,On
+1F	none	
FILTER		

+20	Formant Shift	0~4=0,+1,+2,-1,-2
+21	Cutoff	64+/-63=+/-63
+22	Resonance	0~127=0~127
+23	Mod.Source	0~7=EG1~MIDI2 *T-4
+24	Mod.Int	-63~0~+63=-63~0~+63
+25	E.F.Sense	0~127=0~127
+26~+27	none	
AMP		
+28	Level	0~127=0~127
+29	Direct Level	0~127=0~127
+2A	Distortion	0,1=Off,On
+2B	Vel Sense	-63~0~+63=-63~0~+63
+2C	KBD Track	-63~0~+63=-63~0~+63
+2D~+2F	none	
EG2		
+30	Attack	0~127=0~127
+31	Decay	0~127=0~127
+32	Sustain	0~127=0~127
+33	Release	0~127=0~127
EG1		
+34	Attack	0~127=0~127
+35	Decay	0~127=0~127
+36	Sustain	0~127=0~127
+37	Release	0~127=0~127
LFO1		
+38	Wave	0~3=Saw,Squ,Tri,S/H
+39	Frequency	0~127=0~127
+3A	Sync Note	0~14=1/1~1/32 *T-6
+3B	Tempo Sync	0,1=Off,On
+3C	Key Sync	0~2=OFF,Timbre,Voice
+3D~+3F	none	
LFO2		
+40	Wave	0~3=Saw,Squ(+),Sin,S/H
+41	Frequency	0~127=0~127
+42	Sync Note	0~14=1/1~1/32 *T-6
+43	Tempo Sync	0,1=Off,On
+44	Key Sync	0~2=OFF,Timbre,Voice
+45	(CH LEVEL select)	0~15=CH 01~16
+46	(CH PAN select)	0~15=CH 01~16
+47~+4F	none	
CH LEVEL		
+50~+5F	CH Level CH[1~16]	0~127=0~127
CH PAN		
+60~+6F	CH Pan CH[1~16]	-63~0~+63=L63~CNT~R63

*T-1 :

0: Equal Temp	5: Werckmeist
1: Pure Major	6: Kirnberger
2: Pure Minor	7: Slendro
3: Arabic	8: Pelog
4: Pythagorea	9: User Scale

*T-2 :

0: 1/32	5: 1/8	10: 3/8
1: 1/24	6: 1/6	11: 1/2
2: 1/16	7: 3/16	12: 2/3
3: 1/12	8: 1/4	13: 3/4
4: 3/32	9: 1/3	14: 1/1

*T-3 :

0: Saw	4: Vox Wave
1: Pulse	5: DWGS
2: Tri	6: Noise
3: Sin(Cross)	7: Audio In

*T-4 :

0: EG1	4: VELOCITY
1: EG2	5: KBD TRACK
2: LFO1	6: MIDI1
3: LFO2	7: MIDI2

*T-5 :

0: PITCH	4: CUTOFF
1: OSC2 PITCH	5: AMP
2: OSC1 CNTL1	6: PAN
3: NOISE LEVEL	7: LFO2 FREQ

*T-6 :

0: 1/1	5: 1/3	10: 3/32
1: 3/4	6: 1/4	11: 1/12
2: 2/3	7: 3/16	12: 1/16
3: 1/2	8: 1/6	13: 1/24
4: 3/8	9: 1/8	14: 1/32

*T-7 :

0: 1/48	5: 3/32	10: 1/3	15: 1/1
1: 1/32	6: 1/8	11: 3/8	
2: 1/24	7: 1/6	12: 1/2	
3: 1/16	8: 3/16	13: 2/3	
4: 1/12	9: 1/4	14: 3/4	

*T-8 :

0: Damper	4: Oct -
1: Prog +	5: Portmnt
2: Prog -	6: Arpeggio Off/On
3: Oct +	

*T-9 :

0: Volume	3: A.Touch
1: Exp Pdl	4: BreathC
2: Panpot	5: FootPdl

*T-10: Motion SEQ1~3 Destination List

0: None	10: NoiseLevel	20: EG1Release	30: Patch4Int
1: Pitch	11: CutOff	21: EG2Attack	
2: StepLength	12: Resonance	22: EG2Decay	
3: Portamento	13: EG1 Int	23: EG2Sustain	
4: OSC1CTRL1	14: KBD Track	24: EG2Release	
5: OSC1CTRL2	15: AmpLevel	25: LFO1Freq	
6: OSC2Semi	16: Panpot	26: LFO2Freq	
7: OSC2Tune	17: EG1Attack	27: Patch1Int	
8: OSC1Level	18: EG1Decay	28: Patch2Int	
9: OSC2Level	19: EG1Sustain	29: Patch3Int	

*T-11 :

[+00]: Portamento	[+20]: EG1 Attack	[+40]: Delay Feedback
[+01]: OSC1 Wave Sw	[+21]: EG1 Decay	[+41]: (dummy byte)
[+02]: OSC1 Ctrl1	[+22]: EG1 Sustain	
[+03]: OSC1 Ctrl2	[+23]: EG1 Release	
[+04]: OSC2 Wave Sw	[+24]: EG2 Attack	
[+05]: OSC2 Mod Sw	[+25]: EG2 Decay	
[+06]: OSC2 Semitone	[+26]: EG2 Sustain	
[+07]: OSC2 Tune	[+27]: EG2 Release	
[+08]: OSC1 Level	[+28]: LFO1 Wave	
[+09]: OSC2 Level	[+29]: LFO1 Freq	
[+10]: Noise Level	[+30]: LFO2 Wave	
[+11]: Filter Type Sw	[+31]: LFO2 Freq	
[+12]: Cutoff	[+32]: PATCH1 Int	
[+13]: Resonance	[+33]: PATCH2 Int	
[+14]: EG1 Int	[+34]: PATCH3 Int	
[+15]: FLT KbdTrack	[+35]: PATCH4 Int	
[+16]: AMP Level	[+36]: SEQ Off/On Sw	
[+17]: Panpot	[+37]: Mod Speed	
[+18]: EG2/Gate Sw	[+38]: Mod Depth	
[+19]: Distortion	[+39]: Delay Time	

*T-12 :

0: 1.00	10: 3.50	20: 6.00
1: 1.25	11: 3.75	21: 7.00
2: 1.50	12: 4.00	22: 8.00
3: 1.75	13: 4.25	23: 9.00
4: 2.00	14: 4.50	24: 10.0
5: 2.25	15: 4.75	25: 11.0
6: 2.50	16: 5.00	26: 12.0
7: 2.75	17: 5.25	27: 14.0
8: 3.00	18: 5.50	28: 16.0
9: 3.25	19: 5.75	29: 18.0

*T-13 :

0: 40	10: 220	20: 420
1: 50	11: 240	21: 440
2: 60	12: 260	22: 460
3: 80	13: 280	23: 480
4: 100	14: 300	24: 500
5: 120	15: 320	25: 600
6: 140	16: 340	26: 700
7: 160	17: 360	27: 800
8: 180	18: 380	28: 900
9: 200	19: 400	29: 1000

*T-14 :

0: Up
1: Down
2: Alt1
3: Alt2
4: Random
5: Trigger